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Social Sciences

STREAM COMPLITIONS. A SIMULATION INDEX NATION THAT IT PERSON PRINT MARKET PERSONANCE OF THE FOX RUER, WISCONSIN William B. O'Neil (Department of Economics, Colby folicae, lakewille, Maine, 04901). The state of Maconain has recently setablished the legislative hashs for what may be the first operating water pollution permit market in the United States. The efficient properties of such market have been discussed widely in the theoretical literature, but little emptricat onthe hash been published regarding the patential cost mayings attainable in specific situations. This paper describes part of the emptrical analysis that theoretical interature, and interpreted the creation of a cromsforable discharge permit supported the creation of a cromsforable discharge permit period water quality planning model is developed to illustrate the performance of a TDP market under conditions of varying stream flow and temperature. The model is applied to the case of the Fox River, and used to compare the cost of anticoving target varier quality lavels under conventional vapulatory rules with the cost to the cost entirely and arrived. In addition to the cost entirely and information of a TDP market. In addition of the cost entirely and information of the probable pattern of trading that may occur in the fox River TDP market. (Mater quality permit markets). Water Resour. See., Paper 320435

7310 Economics
CAPACITY EXPANSION MODEL FOR LARGE SCALE WATER
ENERGY SYSTEMS

Mateumosto (Instructional Engineering Co., San Francisco.)

7310 Social Sciences (Economics)
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Forecasts of hydromoteorologic phenomena are inherently uncertain. In practice, uncertainty is aftent jacob a consistent and doctains unkers in coping and exemplary answer to averal fundamental quentional law to optimally use categorical and probabilitatic forecast? What opportunity luneau are expected to be incurred when forecast uncertainty is governed to average when forecast uncertainty is ignored? What opportunity luneau are expected to be incurred when forecast uncertainty is ignored? What classical contingues analysis is subspicted? What forecasts?

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Solar Physics, Astrophysics, and Astronomy

7720 Electromagnotic Radiation THE SOLAR ABSOLUTE SPECTRAL IERADIANCE 1150-3173 %1 17 HAY 1982

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George H. Mount and Gery J. Rottman (LASP, University of Culorado, Boulder, Colorado, 80309)
The full-disk solar spectral irradiance in the spectral range 1150-3177 & was obtained from a tocket observation above Multe Sands Hissile Range, New Magica, on 17 May 1982, balf way in time between solar maximum and solar minimum. Comparison with measurements made during solar maximum in 1980 Indicate a large decrease in the absolute solar irradiance at wavelengths below 1909 X to approximately solar maximum values. Mo thange above 1900 X from the errors of the measurements. We find irradiance at wavelengths below 1909 X to approximately values Juver than the Broadfoot traules in the 2100-most with Stradiance than the Broadfoot traules in the 2100-most with Stradiance to the Herosito of the Instruments for this flight was accompliahed at the National Bureau of icantly improves calibration of the National Bureau of icantly improves calibration of solar measurements for this spectral reaction of solar measurements. Herosito is the special pade in this apectral racion.

Tectonophysics

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CAPACITY EXPANSION MODEL FOR LARGE SCALE WATER
REMERCY SYSTEMS

J. Matsumquo (international) Engineering Co., San Francisco,
L. W. Mays (Department of Civil Engineering, University of
Texas, Austria, Texas 73712).

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ON THE SAN AMDREAS FAULT

Layno Thatcher (U.S. Geological Survey, 34)

Kiddlefteld Road.

Monlo Frat, CA 94025)

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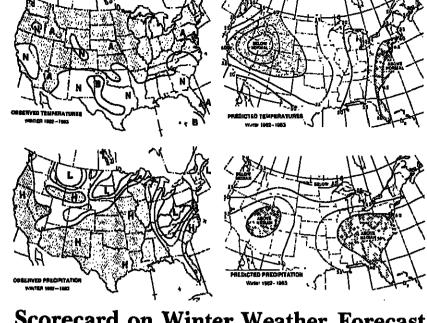
Solar Flares Increased in 1982

Geomagnetic storms and solar flares occurred more frequently in 1982 (5 years after the solar maximum of the current [1-year sunspot cycle) than is usual for that portion of the cycle. Among the most notable events were two X-12 flares and one X-7 flare. Although less intense, the X-7 flave triggered the most fierce geomagnetic storm in a dec-ade; it distorted the earth's magnetic field, disrupted long-range communications and low-frequency navigational systems, inter-fered with ham radio activities, and spread a brilliant auroral display over much of the na-

Solar flares are divided into three classes depending on the output of X radiation; the common C class, the moderate M class, and the intensive X class. The numerical designation indicates the level of radiation intensity; an X-12, which is the most intense that instruments can measure, is 12 times more intense than an X-1. An X-1 flare releases 10 times more radiation than an M-1, and 100 times more than a C-1.

The increase in the number of sunspots in the current solar cycle, the 21st to be recorded began in 1976 and peaked in 1979. A decrease in sunspots has been observed since then and is expected to continue until the solar minimum in 1987. It is generally thought that solar flares and magnetic storms evolve from sunspots and that therefore such Hares and storms would normally decrease in number after the solar maximum; the reason for the high level of activity that developed in 1982 has not been determined.

Although the increase in activity is unusual for the descending portion of the solar cycle, it substantiates the conclusions reached by Masahisa Sugiura of the Laboratory for Extraterrestrial Physics at the NASA Goddard Space Flight Center. In 1980, he proposed that sunspots and geomagnetic activity do not have a straightforward relationship and concluded that. We expect geomagnetic activity to remain high for several years beyond the sunspot maximum epoch. In addition, he speculated that while the number of storms was likely to decrease, the average intensity of the storms was expected to increase, peaking about 3 years after the sunspot maximum (Eas, October 21, 1980, p. 675). Many geomagnetic storms occur throughout the solar cycle; however, it is the recent concentration of activity, containing a high number of X Hares, that concerns scientists, according to Gary Heckman, manager of the Space Environment Services Center of the National Oceanic and Atmospheric Administration. Heckman said that the effects of an intense gep-magnetic storm can disorient migratory birds, increase corrosion of gas and oil pipelines. overload powerlines, and expose space vehicles and passengers in polar jet liners to high levels of solar radiation.—MEG



A comparison of the observed temperatures and precipitation for this past winter (maps on left) with predicted tempera-tures and precipitation (maps on right) shows that the National Weather Service (NWS) temperature prediction was below par, but that the NWS precipitation forecast was 'quite good,' according to Don L. Gilman, chief of the NWS long-range forecast branch. The predictions, issued November 29, 1982 (Éos, December 14, 1982, p. 1211), covered December, January, and February.

NWS long-range forecasters had thought that frigid Arctic air would swoop far south to bring below-normal temperatures to the western United States. Instead, an east Pacific trough, which may have been the strongest since 1900, brought a strong influx of air from the west, according to Gilman. The intense, low-pressure anomaly in the east Pacific, with the strong westerly winds, teamed with heavy rains south and southwest of Hawaii and warm equatorial Pacific waters to bring warm, wet air to the western United States. The results (see maps):

along the Maine coast. This past winter, the NWS predictions

forecast.—#TR

Geophysicists

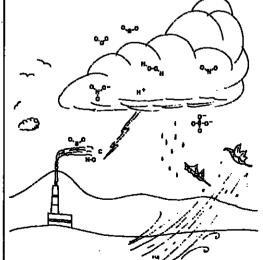
A supplement to the directory of Fulbright scholars for 1982–1983 lists four visiting scientists who are lecturing and conducting advanced research in geology in universities in the United States. (The March 8 issue of Eos lists those U.S. earth scientists who are Fulbright scholars working at universities

fames W. Cole, a reader in geology at the Victoria University of Wellington in New Zea-

Geophysical Monograph 26

ISBN 087590-051-8 1982

Heterogeneous Atmospheric Chemistry David R. Schryer, editor



A single volume dealing with the dynamic chemical processes of the atmosphere: clusters, microparticles and particles, gas-solid interaction aqueous studies,—the heteroge neous reactions in the atmosphere 32 papers devoted to an exchange of ideas, information and methodologie rectly related to the newly emerging science of Heterogenous Atmospher ic Chemistry. The papers include reviews and new research results. Literviews and new research results. Literature on multiphase processes has been extensive but scattered. This comprehensive volume is valuable both to those actively engaged in this study and to those not yet involved because of the difficulties encountered by the dispersion of the literature.

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Scorecard on Winter Weather Forecast

Throughout most of the country, observed temperatures were above normal (A) or normal (N), while observed precip tation was heavy (11) or normal (no code) Below-normal temperatures (B) occurred only in a portion of the southcentral U.S. and the Florida Keys. Light precipitation (L) fell over two patches in the northern plains, in the Appalachian region, and

were made using probability contours. with those predictions with a 60% or greater probability labeled appropriately as above or below normal, (In previous years only two prediction categories had been issued for each torecast, without regard to probability; above normal and below normal for temperature and heavy and light for precipitation. The areas where neither of these categories fit were labeled indeterminate.) NWS analyzed each part of this winter's forecast using the two prediction categories: NWS says it was 36% accurate in its temperature forecast and 69% accurate in its precipitation

land, will be comparing New Zealand and U.S. volcanic rocks at the University of California, Santa Cruz. Tadeusz Cyrul, a rescarcher at the Strata Mechanics Research Institute in Poland, recently completed research at. West Virginia University in Morgantown in the geomechanics of rocks and rock mass for mine design and will continue his work at the University of Kentucky in Lexington. Declar G. De Paor, a lecturer in geology at University College in Galway, Republic of Ireland, is lecturing and researching orthographic analysis of strain and the geological strain in the Appalachian deformation belt at the State University of New York at Albany. Trevor Elliott, a geology lecturer at University College

orum

Midcontinent Seismicity

I enjoyed reading Arch Johnston's article on the Arkansas earthquake swarm (Eos, December 14, 1982, p. 1209), particularly as it appeared shortly after the fourth recent sizeable earthquake here in South Dakota. Recently we had a fifth earthquake. Using preliminary USGS [U.S. Geological Survey] information, the recent history for southern South Dakota is as follows (magnitude (M) is Richter

Date	Lat.	Long.	M
9/13/81	43.1	101.7	3.4
6/22/82	43.1	102.8	3.0
7/11/82	44.0	96.7	3.6
11/14/82	42.8	97.4	4.5
3/4/83	44.2	99.3	4.4

The last three of these earthquakes were widely felt over parts of southeastern South Dakota and neighboring states and caused slight damage near their epicen-

Might not this be a candidate for Johnston's list of the most significant recent episodes of seismicity in central/eastern North America? Particularly when keeping in mind that there are no nearby seismographs to record smaller tremors that night be occurring?

In addition the coincidence of the South Dakota episode at the same time as the Arkausas swarm (which continues, according to a recent telephone conversation with Johnston) makes the present time an interesting one for midcontinent seismic-

This apparent increase in seismic activi ty in South Dakota might provide an op-portunity for study of the seismicity of this part of the continent, were there organizations with available portable seismographs. According to Johnston there is also an opportunity for more investigations of the Arkansas swarm.

> David A. Hastings 212 East 31st Street Stoux Falls, SD 5710!

in Swansea, Wales, is conducting geology tesearch at the Iowa State University in Ames.

Radio Science Editor Change of Address

Persons submitting papers to Radio Science should send them to Kung Chie Yeh. editor designate (*Eos*, February 22, 1983, p. 73), at his new address:

Kung Chie Yeh Editor, Radio Science University of Illinois 1406 West Green Street Urbana, IL 61801-2991

Books

Dynamical Meteorology: An Introductory Selection

B. W. Atkinson (Ed.), Methuen, New York, ix + 228 pp., 1981, \$27.50 (hardcover), \$12.95 (soft cover).

Reviewed by A. Quinet

This volume contains 15 articles written by 10 different authors. As the preface states, it is aimed to simplify some of the most difficult concepts in dynamical meteorology so that this science might become understandable to the nonprofessional meteorologist.

After introducing the fundamentals of atmospheric hydrodynamics and thermody-namics—which is presumably the most difficult part to write in view of the goal of the publication—the book defines vorticity and divergence and discusses their uses in several fairly well chosen examples. Next, the problem of the analysis of meteorological helds is dealt with. Here, not only simple methods are presented but also some applications to actual cases. This leads to an approach of the geo-

Chapter 9 is essentially an historical review of the development of dynamical meteorology. It is not before this part that the name of Euler is mentioned for the first time. The next two chapters relate to atmospheric turbulence: one on the spectrum of the motions, the other on the methods used to obtain the

Chapter 12 is devoted to atmospheric ener-

getics. It goes from the simplest idea, the budget of potential plus kinetic energy, up to the difficult concept of available potential energy. The energy cycle, including zonal and eddy components of the energetic quantities, is also fairly well presented and interpreted in terms of air motion. Chapter 18 is a very in terms of air motion. Chapter 13 is a very interesting attempt to rationalize the behav-iour of the atmosphere in light of the constraints operating on the flow, which is essentially of the district tially of the slant-wise convection type.

Finally some information is given regarding the numerical modeling of the atmosphere and the numerical procedures which are used in this important field. A last chapter discusses the application of the funda-mental concepts of scale and dimensional analysis to partial differential equations.

It is difficult to make a global assessment of such a collection of articles. Taking into ac-count the fact that this book is addressed to nonspecialists, one can regret several misprints, a notation which is not always uniform, and occasionally the use of equations which are not entirely consistent with those introduced earlier. (For example, eq. (8.14) contains the W-component of the Corlolis term, which is not included in the general equation (8.2).) This is another book that shows how difficult the popularization of knowledge is. On the other hand, there is no doubt that professional meteorologists will find value in the special effort of presentation which has been undertaken:

A Quinet is with the Institut Royal Meteorologique de Belgique, Brussels, Belgium.

Books (cont. on b.138)

Books (cont. from p. 137)

New Publications

Items listed in New Publications can be ordered directly from the publisher; they are not available through AGU.

Advances in Geophysics, vol. 24, B. Saltzman (Ed.), Academic, New York, vii + 328 pp.,

The Arctic Ocean: The Hydrographic Environment and the Fate of Pollutants, L. Rey (Ed.), John Wiley, New York, xi + 433 pp., 1982,

Atlas of Igneous Rocks and Their Textures, W. S. MacKenzie, C. H. Donaldson, and C. Guilford, John Wiley, New York, x + 148 pp.,

Carbon Dioxide: Friend or Foel An Inquiry Into the Climatic and Agricultural Consequences of the Rapidly Rusing CO2 Content of Earth's Atmosphere, S. B. Idso, IBR Press, Tempe, Arizona, xiii + 92 pp., 1982. Chemical Hydrology, W. Back and R. A. Freeze

(Eds.), Benchmark Papers in Geology, vol. 73, Hutchinson Ross, Stroudsburg, Pa., xv + 416 pp., 1982.

Depositional Systems: A Genetic Approach to Sedi-mentary Geology, R. A. Davis, Jr., Prentice-Hall, Englewood Cliffs, N.J., xvii + 669 pp., 1983, \$33.95.

Environmental Isotopes in the Hydrosphere, V. I. Ferronsky and V. A. Polyakov, translated from Russian by S. V. Ferronsky, John Wiley, New York, viii + 466 pp., 1982,

Geological Implications of Impacts of Large Aster-oids and Comets on the Earth, L. T. Silver, P. H. Schultz (Eds.), Spec. Pap. 190, Geol. Soc. Am., Boulder, Colo., xix + 528 pp., 1982,

Geothermal Reservoir Engineering, M. A. Grunt, I. G. Donaldson, and P. F. Bixley, Academic. New York, xiii + 369 pp., 1982.

Hamiltonk of Snow: Principles, Processes, Management & Use, D. M. Gray and D. H. Male, Pergamon, New York, xx + 776 pp., 1981. Introduction à L'Économic Générale de L'Eau, A. Erhard-Cassegrain and J. Margat, Masson,

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Nature and Origin of Cretaceous Carbon-rich Fa-cies, S. O. Schlanger and M. B. Cita (Eds.), Academic, New York, ix + 229 pp., 1982,

The Ocean Floor: Bruce Heezen Commemorative Valume, R. A. Scrutton and M. Talwani (Eds.), John Wiley, New York, ix + 318 pp. and pocket maps, 1982, \$106.00.

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lål Sengör, John Wiley, New York, x + 242 pp., 1982, \$45.00. Petroleum Geology for Geophysicists and Engi-neers, R. C. Selly, Int. Hum. Resour. Dev.

Corp., Boston, vii + 88 pp., 1983, \$22.50 cloth, \$15.00 paper. Precambrian Sulphide Deposits: H. S. Robinson Memorial Volume, R. W. Hutchinson, C. D.

Spence, and J. M. Franklin (Eds.), Spec. Pap. 25, Geol. Assoc. Can., Toronto, Ontar io, vii + 792 pp., 1982, \$57.00,

Reseña Explicativa Del Mapa Geologico Del Departamento De Nariño, J. L. Arango and A. Ponce. Informe No. 1818, Ministerio de Minas y Energia, Instituto Nacional de Investigaciones Geologico-Mineras, Bogota, Co-

lombia, iii + 40 pp., 1980.

Rock-Forming Minerals, vol. 1A, 2nd ed., Orthosilicates, W. A. Deer, R. A. Howie, and J. Zussman, Longman, New York, ix + 919 p., 1982, \$149,95.

ediment Budgets and Routing in Forested Drain-age Basius, F. J. Swanson, R. J. Janda, T. Dunne, and D. N. Swanston, Gen. Tech. Rep. PNW-141, U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station,

Portland, Ore., ii + 165 pp., 1982.

Seismic Reflection Interpretation, A. H. Kleyn,
Applied Science, New York, xii + 269 pp., 1983, \$57.50. Space and Planetary Environment Criteria Guide-

lines for Use in Space Vehicle Development, 1982 rev., vol. 1, R. E. Smith and G. S. West (Eds.), NASA Tech. Mem. 82478, NASA, Marshall Space Flight Center, Ala., xii + 220 pp., 1983.

Water Quality, G. S. Tolley, D. Yaron, and G. C. Blomquist (Eds.), Environ. Pol., vol. 3, G. S. Tolley (Ed.), Ballinger, Cambridge, Mass., 1983, \$35.00.

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3. Theoretical Physics (Medium Energy, Paricle Physics, Relativity and Cosmology).

The 1982/83 salary range for an Assistant Profesor is \$27,720-\$39,820 per annum.

Applications will be received until May 1, 1983, and the expected appointment date is July 1, 1983.

The Department of Physics offers both undergraduate and graduate degrees in Physics and Gophysics. The Department currently consists of 47 Faculty Members, 36 Research Associates and Pos-Doctoral Fellows and 50 Graduate Students.

Candidates interested in applying should submit curriculum vitae plus the names of three (5) referees to:

Dr. A. N. Kamal

Dr. A. N. Kamal

Dr. A. N. Kamai
Glaia man
Department of Physics
University of Alberta
Falmonton, Alberta, Canada
Tibe University of Alberta is an equal opportunity
employer but, in accordance with Ganadian immigration requirements, priority will be given to Ganadian clitzens and permanent residents of Canada

Research Positions for Mathematical Physicists. Applications are invited for several research positions at the Center for Studies of Nooisear Dynamics, La Jolla Institute, beginning summer 1983. Can tent research involves work on nonlinear wave-wave inter a tions, acouste, optical, and radio wave propagation in random media, and fluctuate phenomena in the statistical mechanics of chemical and grouphysical systems. Physicists and applied mathematicians who are interested in working on problems of the alove type should send resumes and arrange for three letters of recommendations be sent to Dr. Stanley Flatte, Director, CSND, La Jolla Institute, 89:50 Villa La Jolla Drive, Salte 219, La Jolla California 92:037.

La Jolla Institute is an equal opportunity/affirmain action employer.

Conference

FUNDAMENTAL

MAGNETOSPHERIC PROCESSES

IN THE PLASMAPAUSE REGION

October 25-27, 1983

The University of Alabama in Huntsville

NASA/Marshall Space Flight Center

Huntsville, Alabama

Conveners: J. L. Horwitz and J. L. Green

This conference is designed for experimentalists and theorists concerned with wave and plasma processes in the vicinity of the plasmapause. Appropriate topics for papers to be presented will believe the plasmapause.

to be presented will include: wave phenomena associated with the plasmapause: sources and loss of cold and warm plasmas near the plasmapause; plasmasphere filling identification estimated that the plasmapause in the plasmapause is plasmasphere filling.

imapause to other important magnetospheric boundaries. Attendance will be limit ed. Persons wishing to present papers should send an abstract (use convention for AGU meeting abstracts) to one of the conveners by July 9, 1983. Information on hole

Dr. J. L. Green

205/453-0028.

Magnetospheric Physics Branch/E953 Space Sciences Laboratory

Marchall Space Flight Center MSFC, AL 35812

identification, structure, formation and dynamics of the plasmapause; relationship of

dations will be provided on request.

Dr. J. L. Horwitz

in Huntsville

453-0505.

Department of Physics The University of

Huntsville, AL 35899 205/895-6276/

Geology. Instructor to teach geology, geography, and physical science in public community college. Desire Master's degree in geology or related field with minor inc chemistry, mathematics, or compute science. Prior teaching experience at college level. Start August 1983. Salary range \$15,000 to \$19,000 for academic year. Apply by May 2, 1983, to President, North Idaho College, Coem d'Alene, Idaho 83814.

Statistician (Scientist II)/National Center for Atmospheric Research. To work as a scientististatistician in a multidisciplinary group conducting studies of environmental societal impact of atmospheric processes and carry out independent research program in statistical meteorology and related areas. Requirements include Ph.D. in statistics or mathematics or equivalent skill in applying quantitative techniques such as multiple regression analysis, time series modeling and decision analysis to problems in the atmospheric sciences, demonstrated publications record, and commitment to work in multidisciplinary research projects. Skill in computer programming (FORTRAN) and familiarity with statistical computing techniques as well as statistical software packages desired. A scientist II position is for a non-renewable term of up to four years. Individual may then be appointed to scientist III in accordance with UCAR policy. Position will be available on or about October 1985. To apply contact: Margareta Domecki, 303-494-5151 or send resume and list of publications to: NCAR, Employment, P.O. Box 3000, Boulder, Colorado 80307.

An equal opportunity/affirmative action employer.

Postdoctoral Research Assistantahips./ UGLA. The Space Physics Group at UCLA invites applications for a postdoctoral research position which will become available in October 1988. The

which will become available in October 1988. The position entails the analysis and interpretation of magnetometer data in both carth and planetary orbits. Experience in data analysis and the ability to undertake independent research and communicate the results of the research are required. Computer programming experience is highly desirable. Terms of employment and salary to be determined by the qualifications of the applicant. Impuries should be directed to C.T. Russell, Institute of Geophysics and Planetary Physics, University of California, Los Angeles, CA 90024. Applications should be accompanied by a resume, a complete bibliography and at least two names of references who are well acquaimed with the applicant's background and potential.

ed with the applicant's background and potential.
UCLA is an equal opportunity/affirmative action

An equal opportunity employer.

The Weekly Newspaper of Geophysics

For full articles and incering reports send one copy of the double-spaced manuscript to Eos c/o AGU at the address below and three copies to one of the editors, or send all four copies to Ew For news items, send two copies of the doublespaced manuscript to Eas.

Editor-In-Chief: A. F. Spilhaus, Jr.: Editors: Marcel Ackerman, Mary P. Amderson, Peter M. Bell (News), Kevin C. Burke, Bruce Doc, Robert H. Eather (History), Clyde C. Goad, Arnold L. Gordon, Louis J. Lanzeronti; Editorial Staff: Gregg Forte—Managing Eddor; Kathleen M. Lafferty—Eddorial Assistant; Barbara T. Richman—News Writer; Mario F. Godines—News Intem: Production Staff: James Hebblethwaite. Dae Sung Kim, Lisa Lichtenstein, Vivian Nelso

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For advertising information, contact Robin E. Little, advertising coordinator, 202-462-6903.

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Subscription price to members is included in an nual dues (\$20.00 per year). Information on institutional subscriptions is available on request. Second-class postage paid at Washington, D. C., and at additional mailing offices. Ees, Transactions, American Geophysical Union (ISSN 0096-9041); in additional mailing offices.

American Geophysical Union 2000 Florida Avenue, N.W. Washington, D. C. 20009

Cover. Photomicrograph of a heavily etched surface of experimentally deformed, polycrystalline rock salt. Plane polarized light; scale line is 0.3 mm. Cubic laces {100} have different orientations in each of the crystals and provide a way to map (with the Universal-stage) the crystal lographic orientations of the crystals in e aggregate. Since halite is isotropic to ight, normal optical means cannot be used to orient the crystal axes. Instead, previous methods have involved artificially leaving the crystals (which introduces damage) or using internal, 'cubic' fluid inclusions to map the grain orientation. The etching technique can be used when cleaving is undesirable or impractical or when the inclusions are not available. Further details details may be obtained from Mel Friedman, Texas A&M University, College of Geosciences, College Station, TX 77849. (Photo courtesy of Mel Friedman.)

How EOS's weekly frequency can increase the impact of Advertising

People forget material rather rapidly -even meaningful material. As an advertiser you can be certain that about half the material you present in your ads will be forgotten in about a week. And after three weeks, readers will be unable to recall 80% or more. This makes it difficult to build up awareness over time.

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EOS is the weekly newspaper that gives you the impact you need among the people in the geophysical sciences.

To reserve space or for more information. call 800-424-2488 or 462-6903 in the Washington, D.C. area.

Chairman—Department of Geological Sciences, Wright State University. The Department of Geo-logical Sciences, invues applications for the position of Chairman, to be appointed September 1984. We seek a dynamic individual with administrative talent and an appreciation for research and practice-relat-

ed educational activities. Rank is at the full professor level and no restrictions have been placed on accas of specialization. The department is active with 12 faculty and an emphasis on professional pra-vet maintaining a furn commitment to basic re-

yet manuaring a min communication with and names of three references to:

Chairman, Search Committee
Department of Geological Sciences
Wright State University
Dayton, OH 45435.

Wright State University action/equal opportunity employer.

equal opportunity employer. Closing date for the position is October 31, 1983.

JPL/Geophysicist. Requires a Ph.D. in geophysics with a strong background and interest in tectonophysics. The available position involves contributing to a funded NASA Geodynamics Program investigation involving the use of space geodetic data for regional strain modeling; effective integration of space geodetic data and other geophysical data types in the investigation of western U.S. tectonics.

Desired candidate with demonstrated ability to initiate small research projects and gain support from a variety of sponsors.

To be selected in May, 1983 with a closing date of April 30, 1983. Starting date flexible but should not be after August 1, 1983.

Please submit a resume and statement of interests to Professional Staffing, Department J48, Jet Propulsion Laboratory California Institute of Technology 4800 Oak Grove Drive Pasadena, CA 91109,

Alderson Chair in Applied Ocean Science. The Department of Electrical Engineering and Computer Sciences at the University of California, San Diego invites nominations or applications for a tenured full professorship in that portion of applied ocean science included among the engineering disciplines of this Department. The appointee would be expected to take a leading tule in research and teaching including participation in the undergraduate program.

program. Initial appointment carries with it a five year, re-newable tenure in the Victor C. Alderson Chair, in-cluding orthograms become in the cluding endownient income which may be used at the holder's discretion for research support, scholar-ly travel, summer salary, and other professional ex-

penses. We seek a distinguished engineer or scientist active in such fields as occanic remote sensing utilizing electromagnetic, acoustic, or seismic energy, or ocean-related aspects of signal processing, com-

nitations, control systems, computer engineering, or electronic instrumentation. Each applicant should provide a detailed resume, a list of publications, and names of references before June 1, 1983, to:

Professor F.N. Spiess, Chairman Alderson Chair Search Committee Department of Electrical Engineering and Computer Sciences

University of California, San Diego
Mail Code C-014

La Joha, CA 92093.

The University of California is an equal

SERVICES, SUPPLIES, COURSES, AND ANNOUNCEMENTS

Engineering Analysis of Fluvial Systems

August 1-4, 1983 Copper Mountain Resort, Colorado

State-of-the-art design techniques oriented to solving practical engineering problems associated with watersheds and rivers are presented n this four day short course. The course is designed to enhance the participants' insight into physical processes and the associated mathematical modeling techniques. Design applications are illustrated with numerous case studies. The recently published hardbound text Engineering Analysis of Fluvial System will be provided to each participant.

Lecturers: D.B. Simons, R.M. Li, and P.F. Lagasse

Registration fee: \$450 U.S. Dollars

Contact: Dr. Peter F. Lagasse Simons, Li & Associates, Inc. P.O. Box 1816 Fort Collins, CO 80522 (303) 223-4100

Calderss and Hydrothermal Systems. Held in Yellowstone National Park, August 22–27, 1983. College credit available. For urore information, con-tact: THE YELLOWSTONE INSTITUTE, Box

<u>Meetings</u>

Announcements

Magnetosphere Studies

A preliminary call for papers has been issued for the Symposium on the Achieve ments of the International Magnetospheric Study (IMS), to be held in conjunction with the 25th Meeting of the Committee on Space Research (COSPAR) at the Kongresszentrum in Graz, Austria, June 25-27, 1984. The symposium will examine IMS contributions to the understanding of the earth's plasma environ-

Sessions at the symposium will include structure and dynamics of magnetospheric boundaries; particle sources, transport, storage and precipitation; wave phenomena; and magnetosphere-ionosphere coupling. Review and poster sessions also are offered.

Deadline for receipt of abstracts of contributed papers is November 30, 1983. Papers presented at the symposium, organized by the Scientific Committee on Solar-Terrestrial Physics of the International Council of Scientific Unions, will be published in a volume of proceedings. For further information contact J. G. Roederer, Geophysical Institute, University of Alaska, Fairbanks, AK 99701.

Water Resources

A conference on the implications and possible consequences of the planned diversions of the Missouri River will be held May 24, 1983, at the University of Missouri in Kansas City. sources Planning for the Missouri River Ba-sin' will present facts of the regional studies to reallocate Missouri River water; the second half will explore the political implications of the proposed diversions.

Topics to be discussed include energy, agri-cultural, and economic implications of diversions; the role of the Missouri Basin States Association in water allocation and diversions; the positions of the various states affected by the proposals to divert; Indian rights; navigational consequences; and effects on conservation and recreation of proposed

The conference is sponsored by the College of Engineering and Engineering Extension of the University of Missouri-Columbia; the University of Missouri Water Resources Research Center; the University of Missouri-Rolla Institute for River Studies; the Iowa State University Water Resources Research Institute; the Midwest Research Institute; the Missouri River Shippers and Operators Committee of the Missouri River Basin Association; and the U.S. Corps of Engineers, Kansas City district.

For additional information, contact Virginia Nettleton at the University of Missouri-Co-lumbia (telephone: 314-882-2087).

GOES Satellites

Exploiting METSAT Data for Public and Private Benchts' is the theme of a 2-day workshop to be held April 28-29 in Orlando. Fla., that will discuss the use of meteorological satellite data supplied by the geostationary operational environmental satellites (GOES). GOFS satellites, positioned above the equator, make repetitive observations of the earthand of the atmosphere. Data is transmitted to ground stations and relaved to a variety of

Workshop topics will include cover systems designs; economic and social advantages; routine and unconventional applications; science contributions, and possibilities for the future.

The National Oceanic and Atmospheric Administration (NOAA) and the Hughes Aircraft Company will cosponsor the workshop. Those attending the workshop are invited to observe the launch of the GOES-F satellite at Cape Canaveral, Fla., also scheduled for that

For additional information, contact David D. Carmer, Worldway Postal Center, P.O. Box 91798, Los Angeles, CA 90009 (tele-phone: 213-648-3582).

Geophysical Year

New Listings

The complete Geophysical Year List appeared in the December 21, 1982, Eus. A boldface meeting title indicates sponsorship or cosponsorship by AGU.

April 24-27, 1983 Annual Contenence of the National Association of Environmental Professionals, Detroit, Mich. (NAEP, P.O. Box 9400, Washington, D. C. 20016, tele-phone: 301-229-7171; or Terry Yonker, MAEP, 13609 Grace Drive, Eagle, MI 48822,telephone: 517-626-6260).

Section Meetings of the Geological Society of America (Jean Latulippe, Meetings Department, Geological Society of America, Boulder, CO 80301; telephone: 303-4-17-2020):

April 28-29, 1983 North-Central Section. Madison, Wis.; May 2-4, 1983 Joint Rocky fountain Section and Cordilleran Sections, Salt Lake City, Utah; April 4-6, 1984 Joint North-Central Section and Southeast Sections, Lexington, Ky.; March 26-27, 1984 South-Central Section, Dallas, Tex.

TRAVEL TO **IUGG GENERAL ASSEMBLY**



inexpensive group flights 18th General Assembly of the International Union of Geodesy and Geophysics August 15-17, 1983

AGU has arranged

Departures have been booked on NORTHWEST ORIENT

Hamburg, West Germany.

on August 13, or you may choose from other available flights. Group rates are available from most major American cities (from \$619 round trip East Coast). For reservations and information, call



NATIONWIDE: 1-800-328-7110 • MINNESOTA: 1-800-752-4245

JOURNAL OF CALL FOR PAPERS

Editors: P. J. CRUTZEN and D. H. EHHALT

The Journal of Atmospheric Chemistry is devoted to the study of the chemistry of the Earth's atmosphere with emphasis on the region below about 100 km.

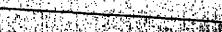
- Original contributions are encouraged on: - observational, interpretative and modelling studies of composition and physico-chemical processes in the Earth's ere, excluding air pollution problems of only local importance;
- the role of the atmosphere in biogeochemical cycles; chemical interaction of ocean, land surface, biosphere with the
- laboratory studies of the machanics in homogeneous and
- heterogeneous transformation processes in the atmosphere; - description of major advances in instrumentation developed for the measurement of atmospheric composition and chemical properties.

No page charges are levied on authors, who will receive 25

offprints free. Detailed Information for Authors is available The Editorial Office, Journal of Atmospheric Chemistry, P.O. Box 17, 3300 AA Dordrecht, The Netherlands.

D. Reidel Publishing Company Dordrecht / Boston





1983 AGU **SPRING MEETING**

May 30-June 3

The 1983 Spring Meeting of the American Geophysical Union will be held in Bakimore from Monday, May 30, to Friday, June 3, at the Baltimore Convention Center. The convention center is linked by an elevated pedestrian walkway to Harbor Place, a development of colorful and unique boutiques and restaurants overlooking Baltimore harbor.

Baltimore has experienced a dramatic rebitth in the last decade. The sparkling Inner Harbor has come to life with the opening of the twin crystalline pavilions of Harborplace, the unusual 423 foot high World Trade Center, the tallest pentagonal structure in the world, and the National Aquarium with its 932,900 gallon , tank capacity. In addition, the Inner Har-bor of Baltimore is a myriad facility of aquatic recreation and history.

The exotic and elaborate variety that encompasses 'Charm City' is evident in eyery phase of life; from its ethnic and reconstructed cobblesione and brick town house neighborhoods, to its vast array of dining establishments, Baltimore is an ex-ceptionally deligitful experience worth sa-

voring.
Shop Baltimore's world famous markets which date back to the late 1700s. Tour the city's cultural and historic attractions, the restored mansions, churches, parks, Fort McHenry, the U.S. Frigate Constellation and the Maryland Science Center. You will be pleasantly surprised at all Baltimore has to offer.

Ahoy! Sall Back Into Baltimore

for the

1983 AGU.

Spring Meeting

May 30-June 3

HOTEL ACCOMMODATIONS

CODE

HRDT

BHDT

HIDT

HHDT

PARKING: Hyatt/\$6.00° Hilton/\$2.60° Holiday inn/free

All hotel reservations must be made on the housing form by April 25, 1983. No telephone requests will be accepted.

individual hotels. After confirmation has been received, changes and cancellations should be made with the hotel

PLEASE RETAIN THIS FORM FOR YOUR RECORDS

Confirmations will be mailed directly to registrants by the

Harbor City Inn/free - (location requires car

or bus transportation to Convention Center)

ROOM RATES

Single: \$58.00 Double: \$68.00

Twin: \$68.00

Extra person: \$15.00

Single: \$51.00

Double: \$61.00

Twin: \$61.00

Extra person:

lo \$190.00

to \$250.00

Single: \$39.00

Twin: \$55.00 Extra person:

\$10.00

Single: \$33.00

Twin: \$42.00

Extra person:

Double: \$37.00

Twin: \$37.00

Extra person:

HCIB Single: \$32.00

Double: \$38.00

Parlor + 1 \$52.00

Double: \$47.00

Parlor + 2 \$200.00

\$10.00 Parlor + 1 \$150.00

PARTICIPATING

Hyatt Regency 300 Light Street (301) 528-1234

Baltimore Hilton

(301) 752-1100

101 W. Fayette Street

Holiday inn - Downtown

301 W. Lombard Street (301) 685-3500

Howard House Hotel

8 North Howard Street (301) 539-1680

Harbor City Inn

(301) 727-3400

1701 Russell Street

* Subject to change.

Mail your completed form directly to:

AGU Spring Meeting Baltimore Housing Bureau 1 East Prait Street

Ballimore, Maryland 21202

Housing Coordinator

HOTELS

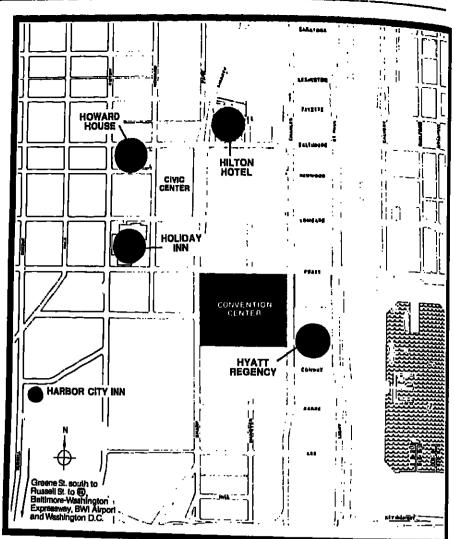
Hotel Accommodations. Blocks of rooms are being held at the Hilton, the Hyatt Regency, the Holiday Inn, the Howard House, and the Harbor City Inn for those attending Read the housing application and mail the completed application form to the housing bureau early to ensure reservations at your preferred hotel.

Transportation. For the visitor arriving at Baltimore-Washington International Airport (BWI), it is only an 8-mile (13-km) ride to downtown Baltimore. Be sure to read the special announcement about discounted airfare, which also applies to flights to and from Washington airports.

Registration. Everyone who attends the meeting must register. Preregistration (received by May 11) saves you time and money, and the fee will be refunded if AGU receives written notice of inability to attend by May 26. Registration for 1 day only is available at one half of the applicable preregistration rates, either in advance or at the meeting. Registration rates are as follows:

	Pre- registration	After 5/
Member	\$65	\$80
Student member	\$82	\$47
Nonmember	\$85	\$100
Student nonmeinber	\$39	\$54
Retired senior member	\$32	\$49

Members of the American Meteorological So ciety, the American Society of Photogrammetry, Union Geofisica Mexicana, the Canadian Geophysical Union, the European Geophysical Union, and the American Congress on



Marican Geophysical Union M **SPRING 1983 MEETING**

May 30-June 3, 1983 Baltimore, Maryland

Housing Coordinator

AGU Spring Meeting

FEast Pratt Stroot

Ballanore Housing Bureau

Baltimore, Maryland 21202

HOUSING APPLICATION FORM

READ CAREFULLY:

Please print or type (pica spaced) all information abbreviating as necessary. Confirmation will be sent by the hotel to the individual named in Part I. If more than one room is required, this form may be photocopied.

PART I	
REQUESTOR	
	
LAST NAME	-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1
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STREET ADDRESS OR P.O. BOX NUMBER	-1
CITY	
	STATE ZIP-U.S.A.
COUNTRY	
	AREA CODE PHONE NUMBER

PART II

INSTRUCTIONS: Select THREE Hotel/Motels of your choice from the list of participating facilities, then enter the appropriate code letters in the boxes below.

RST CHOICE		
1 1 1	SECOND CHOICE	THIRD CH
IOTEL CODE	<u> </u>	
	HOTEL GODE	HOTEL C

NOTE: Rooms are assigned in "First Come First Serve" order and if none of your choices are available, another facility will be assigned based on a referral system arranged by your convention organizer. A cut-off date is in effect and your application may not be processed if received after 14 days prior to your arrival date.

* AGU housing registration deadline is April 25.

PART III

INSTRUCTIONS: 1. Select type room desired with arrival and departure dates.

2. PRINT or TYPE names of ALL persons occupying room.

3. If more than two people share a room, check twin and the hotel will assign

IMPORTANT NOTE: Hotel MAY require a deposit or some other form of guaranteed arrival. If so, instructions will be on your confirmation form. gontifmation form

RETURN THIS FORM WITH

dent member) registration and nonmember registration may be applied to AGU dues if a completed membership application is re-ceived at AGU by July 25, 1983. Current AGU annual membership rates are \$20 for members and \$7 for student members.

To preregister, fill out the registration form, and return it with your payment to AGU before May 11. Your receipt will be included with your preregistration material at the meeting. Preregistrants should pick up their registration material at the preregistration desk at the Convention Center, Monday through Friday registration hours are 8 A.M. to 4 P.M. On Sunday, May 29, registration hours are 5:30–7:30 P.M. in the lobby of the Hilton Hotel. Complimentary badges for guests not attending the scientific sessions will be available at the registration desk.

Surveying and Mapping may register for the meeting at the AGU member rates.

The difference between member (or stu-

Scientific Sessions. The preliminary program with abstracts will be published in Eos. day 3. All scientific sessions will be held at the convention center. See the section below headed 'Program Summary.'

Poster Sessions. Poster sessions will be held throughout the meeting in Exhibit Hall A. These sessions will include papers from almost all sessions of the Union. The normal hours for poster presentations are from 9:00 A.M. to 12:00 noon and from 2:00 P.M. to 5:00 P.M. However, posters for the morning session may be left for viewing until 1:00

For poster sessions, AGU will provide each presenter with a mounting area measuring 4 x 8 feet (1.25 x 2.50 m). The board will be assigned by numbers corresponding to the presenters abstract number. Plan your exhibit to fit this space. The boards will be set up in the designated rooms before the poster session begins. Thumb tacks, push pins, tape, and scissors will be available in the meeting room

Social Events. An Ice Breaker on Monday evening at the convention center is the opening social event of the meeting.

Complimentary refreshments will be served

daily in Exhibit Hall A. Coffee breaks are 9:30-10:30 A.M. and beer breaks 2:45-3:45

Awards Ceremony and Reception. The Awards Ceremony will be held in the Francis Scott Key Ballroom of the Hilton Hotel at 6:00 P.M. on Wednesday, June 1. All meeting participants are invited and are neged to at-tend. A Reception will follow the ceremony; you can meet and congratulate those being honored and share a glass of wine with them

President's Dinner. The President's Dinner in honor of the medalists, awardees, and fellows will begin at 8:00 P.M. at the Hilton. It will be a more lavish and formal aftair; black tie is optional. Tickets for the dinner are \$25 per person. Purchase your tickets with your preregistration.

Exhibits. The exhibit area in Exhibit Hall A will open 9 A.M. Tuesday and will remain

PAYMENT TO:

Meetings Registration American Geophysical Union 2000 Florida Ave., N.W. Washington, D.C. 20009

PLEASE PRINT CLEARLY

NAME ON B	ADGE							
AFFILIATION	١							_
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Telephone #				 		 		

Days you plan to attend.

□ Wednesday □ Monday □ Friday

□ Tuesday □ Thursday Please check appropriate box.

Members of the cooperating societies may register at AGU member rates. Member badges are blue on white.

Nonmember badges are red on white. ☐ Member AGU ☐ Nonmember Member cooperating society.

AMS-American Meterological Society ASP-American Society of Photogrammetry ACSM-American Congress on Surveying and Mapping UGM-Union Geofisica Mexicana

CGU - Canadian Geophysical Union EGS - European Geophysical Union

The difference between member (or student member) registration and nonmember registration may be applied to AGU dues if a completed membership application is received at AGU by July 25, 1983. Current AGU annual membership rates are. \$20 Members; \$7 Student Members.

Preregistrants

Your receipt will be in your preregistration packet. The regis-tration fee will be refunded if written notice of inability to attend is received in the AGU office by May 26. The program and meeting abstracts will appear in the May 3 issue of EOS, which is mailed to all members of AGU in advance, of the

Office	Ųse	Reference	Number	

AGU 1983 SPRING MEETING MAY 30-JUNE 3, 1983 Baitimore, MD.

REGISTRATION FORM: DEADLINE FOR RECEIPT OF PREREGISTRATION

MAY 11, 1983 (rates applicable only if received by May 11, with payment)

	flore than one day	One day
MEMBER	□ \$6 5	□ \$32.50
STUDENT MEMBER	□ \$32	□ \$16
NONMEMBER	□ \$8 5	□ \$42.50
STUDENT NONMEMBER	□ \$39	□ \$19.50
RETIRED SENIOR MEMBER	□ \$32	□ \$16
ABSTRACTS (May 3, 1983, EOS)	□ \$ 5	□ \$5
PRESIDENT'S DINNER -Wednesday	C \$25	□ \$25

SECTION LUNCHEONS

All tickels are \$9.50 except for Seismology which is sponsored, cost is \$5.

☐ Atmospheric Sciences-Thursday

☐ Geodesy-Thursday

☐ Geomagnetism and Paleomagnetism-Wednesday

☐ Hydrology/Wednesday □ Oceanography-Tuesday

☐ Planetology/(Volcanology, Geochemistry and

Petrology/Wednesday □ Seismology-Wednesday

□ Tectonophysics-Thursday

☐ American Express Charge to. ☐ Visa ☐ Master Card	Care Care
Card Number	
Expiration Date	
Signature	
Other navments (Please identify	A \$

Total enclosed \$ _ (All orders must be accompanied by payment or cradit card

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Code			
Check No.			

Information. Make chack payable to AGU.)

Airfare Information Special 30% Discounted Air Fares: Available When You Fly UNITED or DELTA to Baltimore.

UNITED Your toll-free number for flight reservations: 800-521-0810 (Michigan residents 800-482-0243)

Your AGU Convention Number 6318 Special arrangements have been made with United Airlines to offer you a special discount

off regular roundtrip coach . . . available only when you call the unlisted toll-free number of United's Convention Desk: 8:30 A.M.—8:30 P.M. EST Monday through Friday. Just call the above number, available to those within the 48 contiguous states. Ask for the Convention Desk. Tell them you are attending the AGU convention in Baltimore, or give them your AGU Convention Number: 6318.

Here are the details on your special AGU convention fare: 30% lower than the normal roundtrip coach fare in effect at the time of your ticket purchase

No minimum stay is required Travel may commence no earlier than May 23, 1983, and must be completed on or before June 10, 1983 Reservations should be made as early as possible. The final date for reservations and ticketing

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Business Meetings and Section Lun-cheons. The AGU Council will meet Tucsday, May 31, at 5:30 P.M. in the Constellation Ballroom E&F, Hyatt Regency. The annual business meeting of the Union will follow the Council meeting. Members are welcome. Hydrology Section Executive Committe

will meet Thursday, June 2, at 4:30 P.M. in the Preston Room, Hilton Hotel. The Solar-Planetary Relationships Section business meeting will be on Thursday following an afternoon technical session in Room

310. Refreshments will be served. Section luncheons will be held in the Hyatt Regency. Rooms will be published in the at-meeting program. Please indicate on the reg-istration form which luncheon you plan to attend and include payment. Cost is \$9.50 per

ticket (except for the Seismology luncheon).
The Oceanography luncheon will be held on Tuesday. Bruce Robeson, University of California at Santa Barbara, will speak on the Status of the UNOLS Research Fleet. The luncheons of the Geomagnetism and

Paleomagnetism, Hydrology, and Planetol-ogy/Volcanology, Geochemistry, and Petrolo-gy sections will be held on Wednesday. The Seismology luncheon, sponsored by Kinemetrics, Inc., Teledyne Industries, Inc., and W. F. Sprengnether Instrument Co., Inc., will also be on Wednesday; cost is \$5.00 per ticket. Brian J. Mitchell, St. Louis University, will speak on 'The Early History of Seismology in the Central United States.

The Atmospheric Sciences, Geodesy, and Tectonophysics luncheons will be on Thurs-

Program Summary

Satellites & Geosciences, Wed AM History of Geophysics, Wed AM Satellites & Geosciences, Wed PM Test Ban Verification, Thurs AM Test Ban Verification, Thurs PM

Atmospheric Sciences Tropospheric Chemistry, Mon PM El Chichón, Tues AM Dry Deposition, Tues AM Stratospheric Chemistry, Tues PM Ocean/Climate Interactions, Wed PM New Observing Systems, Thurs AM Climate Changes, Thurs AM History of Meteorology, Thurs PM

Earth & Ocean Tides, Tues AM Results on Earth Rotation, Tues PM Crustal Movements I, Thurs AM Crustal Movements II, Thurs PM Gravity Analysis II, Fri AM

Geomagnetism & Paleomagnetism Magsat Studies, Mon AM Long Wavelength Anomalies, Mon PM Paleomagnetism-Sediments, Tues AM Palcomagnetic Results, Tues PM Reversals & Plate Motion, Wed AM

Hydrology General Surface Water, Mon AM Intl. Urban Hydrology I, Mon PM Urban Runoff I, Tues AM Intl. Urban Hydrology II, Tues PM General Hydrology, Wed AM Urban Runoff II, Wed AM General Ground Water, Wed PM Ground Water & Fractures I, Thurs AM Ground Water & Fractures II, Thurs PM Evapotranspiration, Fri AM

Absolute SST Measurements, Mon AM Texas/Louisiana Shelf, Mon AM

Meetings (cont. on p. 142)

Meetings (cont. from p. 141)

SAR & Visible Imagery, Mon PM Gulf of Maine, Mon PM Atlantic Variability, Tues AM STACS, Tues PM Marine Geology I, Wed AM Marine Chemistry, Wed PM Marine Geology II, Wed PM Tides & Waves, Wed PM Paleo-oceanography, Thurs AM Estuarine Geochemistry, Thurs AM Physical Oceanography, Thurs PM Trace Elements, Thurs PM Chemical Fluxes, Fri AM Ocean Currents, Fri AM

Planetology Moon & Mars Meteorites I, Mon AM Moon & Mars Meteorites II, Mon PM Planetary Exospheres, Tues AM Surfaces & Geophysics, Tues PM Planetary Posters, Tues PM

Seismology Prediction, Mon AM Crust & Rays, Mon AM Modes & Surface Waves, Mon PM Sources & Stress, Tues AM Ocean Margins, Tues PM Seismology & Volcanism, Wed AM Global & Regional Seismicity, Wed PM Q & Fluid Interaction, Thurs PM Ocean Surveys & Seismicity, Fri AM

SPR: Aeronomy Exosphere/Ionosphere, Mon AM Airglow/Aurora, Mon PM Thermospheric Dynamics 1, Tues AM Thermospheric Dynamics 11, Tues PM lonosphere/Airglow, Tues PM Atmospheric Electricity 1, Wed AM Atmospheric Electricity 11, Wed PM Radar Studies Ionosphere I, Thurs AM Radar Studies Ionosphere II, Thurs PM Middle Atmosphere I. Thurs PM Middle Atmosphere II, Fri AM

SPR: Cosmic Roys Cosmic Rays in Geophysics, Mon AM Cosmic Rays in Geophysics, Mon PM Flares & Cosmic Rays, Tues PM

SPR: Magnetospheric Physics CDAW-6 Results I, Tues AM Charged Particles I, Tues AM Waves & Instabilities, Tues AM

Tail & Boundary Layer I, Tues PM Jupiter & Saturn, Tues PM Numerical Simulation I, Tues PM CDAW-6 Results II, Tues PM Aurora & Substorms I, Tues PM Currents & Fields, Tues PM Tail & Boundary Layer II, Wed AM Frontiers of SPR, Wed PM Numerical Simulation II, Wed PM Charged Particles II, Thurs AM Waves, Currents, E Fields, Thurs AM Numerical Simulation III. Thurs PM Aurora & Substorms II, Thurs PM Lab & Space Experiments, Fri AM Aurora & Substorms III, Fri AM

SPR: Solar & Interplanetary Physics Solar Seismology, Mon AM Corona & Solar Wind, Tues AM Sunspots & Solar Data, Tues PM Shocks I. Wed AM Shocks II. Wed PM MHD Turbulence in Space, Thurs PM

Ridges & Convection, Mon PM Subduction, Tues AM Crustal Deformation, Tues AM Mineral Physics, Tues PM Ocean Crust, Tues PM Cracks & Brittle Behavior of Rock, Wed AM Structural Geology, Wed PM Continental Crust, Thurs AM Paleo-oceanography, Thurs AM Basins & Seismic Reflection, Thurs PM Ductile Rock Deformation, Thurs PM Q & Fluid Interaction, Thurs PM Mantle Heterogeneities, Fri AM

Volcanology, Geochemistry, & Petrology Andean Magmatism I, Mon AM Ophiolites & Auorthosites, Mon AM Andean Magmatism II, Mon PM Precambrian, Mon PM Oceanic Basalt, Tues AM Isotope Geochemistry I, Tues AM Volcanic Petrology, Tues PM Isotope Geochemistry 11, Tues PM Nenoliths, Kimberlites, Wed AM Water in Silicate Melts I. Wed AM Water in Silicate Melts II (Posters), Wed PM VGP Posters, Wed PM Mantle Heterogeneities I, Thurs AM Experimental Petrology I, Thurs AM Experimental Petrology II, Thurs PM

Manule Heterogeneities II, Thurs PM

Metamorphic Petrology, Fri AM Mineralogy & Crystallography, Fri AM

Membership Applications Received

Applications for membership have been re-ceived from the following individuals. The letter after the name denotes the proposed primary section affiliation; the letter A denotes the Atmospheric Sciences section, which was formerly the Meteorology section

Regular Member

Arthur B. Baggeroer (S), Arthur L. Besse (SS), Pat Blackwelder (O), R. Allyn Clarke (O), Roger A. Clay (R), Peter J. Coney (1). David A. Farrell (H), John W. Fowler (H), Dulal C. Goswami (II), Frank R. Harris (SA). Caroline M. Isaacs (V), Gregory N. Ivey (O), Charles Jacoby (O), Lee 11. Jefferis (1), Joseph P. Kahan (G), Mark W. Killgore (H), Randall L. Moory (H), William R. On (S), David C. Rubic (T), James C. Shive (11), Martin E. Spongberg (T), Marshall R. Taylor (11). David B. White (T).

Student Member

Frank Adams (SS), Francis Alvarez (T), Derick Balsiger, Andrew Baniukiewicz (11), Maurice Bloomstine (O), Michel Boily (V), Michael D. Brehm (H), Charles B. Connor (V), Roman E. Glazman (O), Charles M. Gotman (T), Melinda M. Hall (O), Patricia A. Julien (H), Richard F. Kantenberger (S), David A. Kline (T), Michael R. Nelson (T), Anthony D. Owens (V), Jan Svejkovsky (O).

Associate Member

Noel E. Bormann (H), Paul W. Glack (S).

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Expressly for women intending to make a careor in the atmospheric scioncos This monotary assistance, provided through a gift from June & con Rercey, a noted meleorologii, will be given to a woman who show acadomic achievement and promiso. To qualify, candidates must be one of the following:

• a first-your graduate student in an advanced degree program in almospheric sciences:

 an undergraduate in a bachelois degree program in almospheric sc encos who has been accepted for graduate study;

a student at a 2-year institution of ferling at least six semester hours of almospheric sciences, who has been accepted for a bachelor's degree program, and who has completed at of the courses in atmospheric science offered at the 2 year institution.

Awardee selection will be made by the AGU Subcommittee on Women in Geophysics in consultation with the AGU Almospheric Sciences Section.

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Geochemistry

Geochemistry

1410 Chemistry of the Atmosphere

1RACE ELL-ENIS IN MARKE ARROSOL PARTICLES FACH

ENIMETAK AROLL: I. COMENTRATIONS, GOURCES, AND

1EMORAN, VARIABILITY

R.A. Duce (Center for Almospheric Chemistry Studies,

Graduate School of Geanography, University of Rhode

1sland, Kingston, Rhode Island, Q28813, R. Ariroto,

B.J. Pay, C.A. Unni and P.J. Harder

The concentrations of twenty-nine elements were

reasured in aerosol particles collected in 1979 during

SEARTE experiments at Enemetak Atoll (1108, 1879)

in the tropical Morth Pacific. The concentrations of

Ms. Mg. (1, X. Ca, and &r were dominated by marine

sources; these elements had shell are base-size

distributions, and their atmospheric Concentration

ratios (normalized to ha) were similar to the

corresponding ratios in bulk seawater. Atmospheric

inputs of Aluminosilicate particles from crustal

weathering controlled the aswater. Atmospheric

concentrations of Al, Sc. Mn. Fe. Co. Cs. Bs. Ce. Eu,

Mf. Fa. and Mn. Mean concentrations of these

crustally derived elements decreased by an average of

91 percent, fa. Al. percent) from the local dry season

(April to Pay) to the wat season (July to August);

this general decrease was attributed to the abatement

of dust stores in Asia. At these the influx of dust

from Asia dominated the concentrations of y. Cr. Rb.

and Cu in aerosol particles, but when dust

concentrations decreased, non-crustal sources for

these elements became apparent. A fourth group of

elements (Zn. Sp. Ag. Cd. Sb. 1, and Pb) entitled

than those expected from the flux of sea sity or the

dispersal of mineral aerosol particles. Enrichments

of These trace elements relative to average crustal

saterial increased as the atmospheric dust

concentrations subsided. (Marine aerosol particles,

trace elements).

J. Gaophys. Res., Green, Paper 300415

1420 Chemistry of bodies of water CALCETS STREAMPLATION AND PRECIPITATION STREETS IN THE LOWER CONCERN STREAMPLATION AND PRECIPITATION STREETS IN THE LOWER CONCERN STREET, ALL-ARIELICAN GAMA AND EAST D. L. Sarrer (M. S. Salimbry Laborstory, USDA-ARS, Riveredde, California 92360)
In situ pil determinations and analyzis of major (one in solution indicated that the Lower Colorade Liver in soperasturated with respect to railing thinghout the antire delig cycle, in John Wenter and summer. Although the los selevity product used a to 6 times fracter than the calcice solublity product there was no detectable, practical calculation. Checkted inalyses of water sumpless taken proceedings of the saling and causaly from factor Ben to the Saling des Salon provided on syddence of calcium and helphy supercalifaction despite the Indian for Saline Calcium and Palaty Supercalifaction despite the Indian for Saline Especially Magain products indicated that calbits

crystal growth rates with Colorado River water are about 10% of that for pure Ca-HOO; watere and about 70% of that for synthetic Colorado River water. Calcite precipitation by crystal growth in the river to limited by the combination of short residence times and unavailability of reactive calcite. Critical supersaturation lovals necessary for beterogeneous nucleation do not occur; high suspended load limits algal photosynthesis, and thus prevents large decreases in device H₂CO₃ levels. (calcium carbonate, crystal growth, water quality, pR stat).

1440 Chemistry of the Solid Earth
UPPER MANTE CHIDATION SYSTE: EVIDENCE FROM CLIVINECREMOTHECHNEW THE STRINGLORS
David M. Eggler (Department of Generiances, The Pennsylvania State University, Chiversity Park, Pennsylvania,
16802)

vania state intermity, University Park, Pennsylvania, 16802)
Chygen fegentiles of olivine-orthopyrosens-imenito-bearing, high-pressure magacrysts, mineral intergrouchs, and paridoities from Limberlines and from a minette have been calculated from the equilibrium 2Peg0y + 4988103 m 878810, 852 + 0y. Resultant 102'ss, which are interpreted to railect the subcontinental source regions of sikelic magmas, are clustered between the quarte-fayeline-magnatize and magmas, are clustered between the quarte-fayeline-magnatize and magnatite-watthe buffers. These relatively paidized conditions are compatible with at least some estimates of 60 of typical beauts. They are also compatible with existence of carbonate sine-rais and dispand or graphics and, if finida are present, with water-tich Ey0-C02 fluids rather than Cig-820 fluids. (Mantle redux esse, kimberline modules, mantle fluids) Geophys. Eme. Latt., Papet 310427

1460 Caschrosology
FRUPTION ACT OF A PLEISTOCHE BASALT FROM *GAr-19Ar
AGALTSIS OF PARTIALLY BEGGSSED XEROLITHS
A.R. Gillespie (Jet Propulsion Laboratory, California
lustitute of Fachnology, Fassdans, CA 91109), J.C.
Buneke, and C.J. Masserburg,
be have applied *DAr-19Ar duting to potassion-rich
Stanitic resolities and host basalt from the Pleistocase Big Fine volcanic fisel, California. These
vanoities and been partially deguased upon their inclusion in the basaltic laws. Argon released from the
xenolities of standard and properties below -300°C
yielded Plateau ages indistinguishable from the toral
K-Ar age of the basalt. The best estimate of the age
infigher temperature structed radiogenic argon not
deguased from the laws Crateconus aucolithe 1:18 my
age, causing so increase in the apparent age for the
high-temperature smolith plateau ages and the basalt X-Ar
ages desconstrates that *QAr-19Ar analysis of xebolities
any be deed to measure the age of aruption of very
young laws. This is significent because in many
instances ages caused be reliably determined by
J. Caophyn. Res., Rad, Paper 180439

t 2550 Time vertations, diurnal to secular ON THE RECENT VARIATIONS OF THE APPARENT MESTWARD DRIPT RATE
J.L. Le Moudl, J. Ducruix and C. Ha Duyun (University) Paris 6, 190, 4 Place Jussibou, 75230 Paris, France)
We compute the westward drift (w.d.) Tate of the geomagnetic of the sphorical harmonic exponsions of the main field and of its secular variation. To aliminate the bias contained in the various entu of coefficient we use in the second method raw observatory data. Using amoothed observatory data gives a curve u (the w.d. rate) as a function of time which has a sharp V-shape. Then it is established that the 1969-1970 secular acceleration impulse ("jark" clearly correlates with the time variation of the w.d. rate. (Socular variation, westward drift, main field),

Geophys. Res. Lett., Paper 35033

2560 Time variations, paloomagnotise

A MEM ROCK-GOUNTIC APPROCE TO SELECTING SEDIMENTM
PROCK-GOUNTIC APPROCE TO SELECTING SEDIMENTM
PROCESSAGE TO PALEOINTENSITY STUDIES; APPLICATION
TO PALEOINTENSITY FOR THE LAST 4,000 YEARS

John M. Sing, (Department of Geology and Geophysics,
University of Minnesota, Minnespolis, NM 5595), Subir
The hypothesis that the ratio of detrital remanent
magnetisation to anhysteratio remanent empedication
(DRM/ARM) for sediment samples in a measure of relative geomagnetic paleointensity is critically evaliated by two distinct approaches. One approach in a
detailed rede-magnetic examination of the implicit
assumptions of the DRM/ARM ention and the construction
of a selection process by which to identify sediments
that conform to requirements satisfying these manusptions. Sediments are "uniform" with respect to
DRM/ARM ratio if they contain magnetic in the 1-15 um
particle-size range as the predominent magnetic
mineral and have variations in pagnetic content of
less than 20-30 times the minimum obscentration. The
DRM/ARM ratios of these sediments should provide estimates of relative geomagnetic paleointensity,
Selative particle-size variations in magnetice actimates of relative geomagnetic paleointensity
dies range - 1-15 µm is approximately identified by
a proposed that these sediments with these techniques indicates that these sediments with the

J. Geophys. Res., Red., Paper 350431

Clin Lieundeare;
A Cumbino district Cli / Adary (CA) Mobil to Describ 27
Diber-local startist content inalgebra; for Uniquentes
Groundeal startist of United in Clear Robelling)
H. R. Schulz (has logicale Pal-notelogia her institut 57
Universitat Kirl, Kirl, Germany) and F. T. Rearks,
Department of Limit to Inners, University of Reed 5,
Materion, University of A combined by Clin and Clin and Clin and Combined December of Section 1972
A combined two directional missing collanguistical noise too. In presented which does they waitiple residentify thousand to personnel which does they waitiple residentify thousand the combined which they make the property in unbilities that grounds are the combined they are the content.

noting to a transmitted which does the smaller residentially trained to middle them them smaller residently trained to the scale of the scale them to the store of them to the store them to them to the store of the scale of the Mervations, Water Benone, Sen., Paper 380217

Nature Penner. New., Paper 180217

3140 Limmingy
NATURAL SINGE-CIRCUITING OF INFLOW TO OUTFLOW
THROUGH SILVER LAKE, N.Y.
John P. Englert and Konton M. Stewart (Dept.
Biological Science, State University of N.Y.
Buffalo, N.Y. 14760).

The proximity of the major inlet to the outlet of Silver Lake, N.Y., permits some short-circuiting of the incoming flow. This feature, unusual to decomin lokas, is verified with data which show the the inlet and outlet waters resemble each other more than they do the lake. Rhodomine dyes and come inorganic chemical variables have been used as inorganic chemical variables have case for short-circuiting appears less clear dorling some low inflows and is complicated by water level manipulation at a small daw on the outlet and withdrawal of water from the lake by communities.

The significance of short-circuiting for this intribution of the prophic measurement of the state of the communities in the same complete states and outrient loading for such lakes are sore complete, in the same state of the prophic conditions in this same state lakes, or in parts of some lakes, may be seen incomplete string than a small property of the same lakes, may be seen incomplete string than a small property of the same lakes, and the same lakes. Paper 380148

increases a state of the control of

Side Rumoff and Streamflow
THE EFFECT OF CERTAIN RESTRICTIONS IMPOSED ON THE
INTER-ARRIVAL TIMES OF FLOOD SYENTS ON THE POISSON
DISTRIBUTION USED FOR MODELING PLOOD COUNTS

1. Ashkar and J. Rousselle (Clvil Engineering Department
Reds Polytechnique) P.O. Box 6078, Station A, Montreal,
Queber, Canada HiS. SA7

In the application of partial duration agrics models
of flood analysis it is occasionably observed that succassive accedences are correlated. To reduce this
correlation, some investigators tend to impose cortain
restrictions on the inter-arrival times of flood events
in order that those events will not occur close togother
in bunches. We show analytically how such restrictions
interferre with the underlying hypotheses of the Poisson
process commonly used to model flood counts and we
caution against imposing restrictions that may render
this simple and appealing model inapplicable. (Ploods,
partial duration series, Poisson process). Water Resour. Res., Paper 390028

Nater Resour. Ras., Paper 190028

3100 Runoff and Streamflow
SMER REMARKS ON THE TRUNCATION USED IN PARTIAL FLOW
SMER REMARKS ON THE TRUNCATION USED IN PARTIAL FLOW
SERIES MODELS
P. Ashkar and J. Rousselle (Civil Engineering Department
Foole Polytechnique) P.O. Box e079, Station A. Montroel
Quebec, Canada H3C 3A7
In the partial duration series approach to the problem
of Flood smelysis, the truncation level above which
streamflow is regarded as flood flow plays a key role.
In the absence of a systematic and well defined method
for selecting such a level in practice, it is desirable
to know how different choices effect the obtained
results. We base our mathematical invextigation on some
commonly used partial flood series models to show that
once the time-dependent Polsmen process, used in modeling flood frequency is found applicable with a certain
truncation lavel, then it should remain so with any
higher truncation level. We also point out that this
same property holds true for the exponential distribution widely used in the study of flood anguitude. At
the end of our investigation we give a number of remarks
on some problems involved in the practical application of
partial duration series models. (Floods, partial duration series, Polsson process, Exponential distribution).
http://paichion.org/paper/

1160 Ronoff and Streamflow
ESTIRATING A PEGICNAL FLOGO PRECUENCY DISTRIBUTION
J. P. Steadinger (Dept. of Environ. Engineering,
Cornell University, Tthaca, New York, 1485))
Then floods at different sites are assumed to
srise from the same distribution except for scale
(U.S.G.S.'s Index Tlood Nethod), one can attempt
to identify the dimensionless flood-flow fraquency
distribution by normalizing small samples by each
sample's stuple wan. Unfortunately, the tosultent curve may be a poor description of the true
dimensionless flood distribution. This problem can
be oversome by working with the logarithms of the
peak-flow values and using unbiased moment or probshitty weighted moment estimators. Monewer, the
correlation among concurrent flood flows in a reviou
is shown to place severe limits on the acquacy with
which a distribution's mean, variance, third central which a distribution's mean, variance, third central novant, and skewness coefficient can be setimated with many such correlated records. (Regionalization, flood-flow frequency analysis, probability weighted Vater Resour. Res., Paper 3W0150

3175 Soil moleture
A COSTATISTICAL APPROACH TO THE TRICKLE IRRIGATION
DESIGN IN HETEROGENEOUS Soil: I. THEORY
Devid Russo (Bivision of Soil Physics, Agricultural
Research Organization, The Volcant Center, Bat Dagan,
Israel.)

Research Organization, The Volcant Center, Set Degan, Israel.)

A goostatistical approach was used to investigate the spatial variability of two hydraulic persectors, the saturated hydraulic conductivity, Kg., and q! = d[log Kfb]/db, where K is the hydraulic conductivity and h is the soil vater pressure head. The spatial distributions of Kg. and q! coupled with a linearized solution to exceedy infiltration from a circular shallow pond, were used to calculare the spatial distribution of the aldway soil water pressure head between emitters. he (for a given tricite discharge, Q, and spacing between emitters, d) and the resultant spatial distribution of the crop yield Y. It was found that the apatial variability of he roduced the average (over the field) errop yield that would have been obtained when he was uniform throughout the field by St. The spatial distributions of Kg and quero used to calculate the spatial distribution of directive the calculate the spatial distribution of directive the continue with hydraulics principles to derive the lateral disarter and length for engineering design requirements. (Hydraulic conductivity, soil water pressure head, variogram, kriging, crop yield).

Mater Resour. Res., Paper 180183

JIBO Water Quality (Soluta Transport)

SINULATION OF SOLUTE TRANSPORT IN A MOUNTAIN POOL-ANDRIFFLE STREAM—A TRANSPORT IN TORACE MOUNTAIN POOL-ANDRIFFLE STREAM—A TRANSPORT STORACE MOUNTAIN POOL-ANDRIFFLE STREAM—A TRANSPORT STORACE MOUNTAIN POOL-ANDRIFFLE STREAM—A TRANSPORT STORACE MOUNTAIN STREAMS

All the sense of the sense o

3180 Mater Quality (Solute Transport) SIMULATION OF SOLUTE TRANSPORT IN A MOUNTAIN POOL-AND-RIPPLE STREAM WITH A KINETIC MADS TRANSPER MODEL FOR SORTHOW

SORPION
Lamesh E. Sancals (U.S. Geological Survey,
135 Hiddlefield Rd., MS 96, Menle Park, California, Name of the second seco ter Resour. Res., Paper 300375

1160 Weter Quality (Sediment-water Interface)
KINGIIC ARMAINS OF STRONTIUM AND FOTASSIBM SORPTION
ONTO SARDAINS GRAVELS IN A RATURAL GRANGE.
Kenneth E. Sencais (D.S. Geological Survey),
35 Hiddlefield Md., MS 96, Menlo Fark, Chiliopnia,
95023). Alair J. Jackman, vance. C. Kennedy,
Romald J. Awamian, and Gery W. Bellwager
A kinetic, first-order mass transfer model was used
to describe the scrption of strentium onto band- and
Stavel-min strembed and function. Rate parameters,
supplically determined for etrontium, allowed for the
prediction of potassiem scrption with moderate
which particle site.
The model parameters varied significantly
with particle site.
The opplian data ware nollegted during as
experimental injection of saveral elements into a

small, mountain, padi-and-riffic atroms. The sorption process onto sand- and gravel-size sediment was relatively slow compared to changes in the dissolved concentrations. (Sorption, Finetics, Streambad). Water Pescur. Rab., Paper 190374

3190 Hydrology (Instruments and techniques) CONTAMINATION OF SUCCESSIVE SAMPLES IN PORTABLE FUMPING SYSTEMS

CONTANIANTION OF SUCCESSIVE SAMPLES IN FORTABLE FUMPING SYSTEMS
R. B. Thomas (Pacific Southwest Forest and Range Experiment Station, USBA-Forest Service, 1700 Bayview Drive, Arcata, California, 95521] and R. E. Eads
Tests for contamination of successive samples of suspended aediment were done on two types of portable pumping samplers. Each machine took four successive samples alternatively from a high sediment drum (concentration = 500 mg/1) and four from a sero sediment drum to fill all 24 bottles, Reference samples were also taken from the high sediment drum. Both types of samplers lagged in adjusting to a new concentration level, but the peristaltic samplers performed better then the pressure-vacuum samplers; especially when changing from high to low concentration. The median of the first of a series of four zero sediment samples taken with the pressure-vacuum machines was nearly 200 mg/1. These machines adjusted to a high sediment concentration about 125 mg/1 above the reference concentrations, lags were caused by particles over 0.062 mg/1 above the reference concentrations, lags were caused by particles aver 0.062 mg/1 above the samplers to a level above the ambient concentration. When samplers are taken at long time periods on small flashy streams the major effect is to reduce the estimate of variance.

Water Resour, Pea., Paper 3W0252

Nater Resour, Res., Paper 180252

1199 Conorsi (Geothermal)
MUMERICAI STUDIES OF THE HEAT AND MASS TRANSPORT IN THE
CERRO PRISTO OFFITERMAL FIELD, MEXICO

M. J. Lippeann and G. S. Bodwarmson (Earth Sciences Division, Lawrence Berkeley Laboratory, Berkeley, Califormia, 34720)

Numerical simulation tochniques are suployed in studies of the natural flow of host and mass through the
Cerro Prieto reservoir, Maxico, and of the effects of
evolvitation on the field's behavior. The reservoir
model is a two-dimensional vertical cast to west-southwest cross section, which is based on a recent hydromeaclesic model of the questhermal system. The numerical code MURANS is used in the simulation studies.

The neady-sate prossure and temperatures distribution are computed and compared opsimat observed preproduction pressures and temperatures; a reseousble
match is obtained. The model is then used to simulate
the behavior of the field during the 1971-1978 production period. The response of the model to field extraction agrees to what has been observed in the field
or postulated by other authors. There is a decrease
in tamperatures and pressures in the produced region
No extensive two-phase sone develops in the reservoir
because of the strone fully technique force of the fluid
rachareins the avarem comes from colder replans located
above and west of the produced reservoir.

Water Resour. Res., Paper 180385

Meteorology

THE HEABURDENT OF EXTRACTABLE PARTICULATE ORGANIC MATTER AT A NON-URBAN ARRA IN THE MORTHEASTERN UNITED STATES

P. J. Lioy (Institute of Environmental Medicine, New York University Medical Canter, N.Y.C., N.Y., 10016) 7. J. Kneel and J. H. Daisay

The concentrations of streephrsic attractable particulate organic matter (EDM) were thessured at Starling Forest, N.Y. and Plegwood, N.J. during the portiod 1977 through 1979, and the suggest of 1981, respectively. The samples were taken on a monthly beals for Starling Forest and were treasured at three day composites at Ringwood. The Starling Forest study indicated there was significant variability in the concentrations of the cyclobaxes, dichloromethens and sestence astractable organics beassured at this rural site worn conjured to. New York Lity, located 50 piles to the contensar. The highest concentrations measured at the tural situs were for the polar fraction (as identified by Acetone Extractable Organic Mass). The wintertima levels of ECM were very low when compared to New York City, indicating the lack of meny local cources for space heating. The summertime ECM levels, at the rural sites, however, 4dd show spisodic excursions, which appeared to be associated with periods influenced by regional photochemical amog. During the Ringwood, N.J. Study, the regional nature of the acrossl was setablished using SQ.—5 measurements taken in Newark, N.J. When compared to data taken of remote locations of the world the swreage ECM levels observed in this study were higher. This would be expected because the stree are partodically downwind of major industrial and urban centers. (Farticulate Matter, Organics, Atmospheric, Air Follution).

J. Goophys. Ras., Green, Paper 300499

3715 Meteorology (Chemical composition and chemical interactions)
STRATOSPHERIC NO., 3. THE EFFECTS OF LARGE SCALE HORIZONTAL TRANSFORT

J. F. Noxon (Fritz Feat Observatory, MOAA/Astonomy laboratory, Roulder, Colorado, 80303), W. R. Hemderson and R. B. Noxon
This paper discusses several extended sets of massurements of atratospheria NO, pear 20°M and in the region 40°M-70°M. The printipal concern at high latitude is with the relation between the NO, column abundance and quasi-horizontal 120 pear 20°M and in the region 40°M-70°M. The printipal concern at high latitude in winter when the Elow is rapid in comperison with the rate of photochesical readjustment. When polarity originally low in NO, 1s dealward to lower latitude on observes a drop in NO₂ abundance; the drop is less the lower the latitude of Observation owing to the greater time awatishle for NO₂ to be caleased from the polar night storage species. A study of tokal carona column abundance and the flow at 100 mbar indicates a close relation between them similar to that for NO₂ at Mighar skiftude.

higher mititude. J. Geophys. Res., Green, Paper 300500

Interactions
Of the MAINTENANCE OF the MARINE SOUNDARY LAYER-PRINT TREPOSPHERIC GRADIENT ON TRANSIERT TRACES
L.T. didd (Division of Materology and Physical Oceanography, University of Massi, Missi, Florida, 13149)
A steady state budget for trace gases in the marine boundary layer is developed from a simple model of the marine boundary layer. Tracer balance is estimated in the marine boundary layer. Tracer balance is estimated in the marine boundary layer that the property of tracer; (41) pupping of tracer out of the marine boundary layer into the free troposphera by alouds, (411) penetration of tracer from the free troposphera into the marine boundary layer and the free troposphera into the marine boundary from compensating subsidence in the cloud free six surrounding cussius clouds, (10) ges enfaces estassion or deposition of the tracer, and (9) in situ photochemical production or loss of tracer within the marine boundary layer. The budget question is used to derive an expression for the mixing ratio difference between the such described in the free troposphera. Oncoloss cloud wass flux is found to modulate all other processes which determine the mixing ratio difference between the two regime. A scale amplysis indicates the marine particulated and the free troposphera can be an order of segultude smaller in disturbed wasther conditions compared to suppressed conditions should be traced in chemical concentrations between the free troposphera can be an order of segultude smaller in disturbed wasther conditions from sealing of the basis of chemical seasurements. The Dy seasurements made during Galdrad (Clobal Amospharie Massiciament Experiment on Troposphera for the content of the modular layer are discussed in the content of the modular layer are reposphera ender from seasurement of the boundary layer are reposphera for seasurement of the boundary layer are reposphera seasor from seasurement of the boundary layer are reposphera seasor from seasurement of the boundary layer from traposphera seasor from seasuremen

3720 Chimatology Average ozore profiles for 1979 from the Nimbus 7 Sbuy Instrument

AVERACE OZONE PROFILES FOR 1879 FROM THE NIMBUS 7 SHIV INSTRUMENT

B. D. McPeters (Laboratory for Planetary Atmospheres, NGS/Goddard Space Plight Center, Greenbelt, Maryland, 20771), D. P. Hearth and P. K. Bhartla Monthly average grone profiles from the first year of operation the soler backscattered ultraviolet (SBUV) instrument on the Nimbus 7 satellite (Novamber 1978 through October 1979) are tabulated for ten degree latitude bands from 80°S to 80°N. For each month and latitude tome we list layer exone accounts and standard deviations for 12 Unisher layers (approximately 0-00 km) and the average stall exone for deach tome. The exone mining ratio and number density at the canter of each layer are also given. We find that the average SBUV profiles agree with average Unisher profiles measured at Boulder to within 10% ever most of the range. The Krunger-Minaner model is found to be a good representative cione model for 45°N. Agreeing with an annual average of our measured profiles to better than 10% between 20 and 60 km. (Ozone, even ciliantelogy).

J. Geophya. Res., Green, Paper 100513

J. Geophya. Ros., Green, Paper JCO513

1725 Convection, turbulence and diffusion
POKER FLAT MST RADAR OBSERVATIONS OF SEKAR
INDUCED TURBULENCE
S. A. Smith (Geophysical Institute, University of
Alaska, Fairhanka, Alaska 99701), G. J. Romick and
E. Jayawetra

Wind apped and Co 2 measurements made with the
Poker Flet, Alaska MST radar are used to study the
development of clear air turbulence (CAT) mear the
tropopages. Arguments and observations Ledicating
that Co 2 is proportional to the intensity of turbulence are presented. The relationship between wind
shear and turbulence is examined using time-langed
cross correlations between vertical wind shear and log
Co 2 time series. From malyais of data taken with
special resolutions of 2200 a and 750 m, it is found
that the correlation improves as the time and special
resolutions of the measurement improve. The implications for forecasting CAT are discussed, based on the
correlation results and a comparison of tadar data
with Mational Mgether Service CAT forecasts.
(turbulence, Co 2, wind shear, MST rader, CAT forecasts)
J. Geophys. Ros., Green, Paper 100501

1715 Heteorology (Ice crystal charges)
CHARGE ON ICE CAYSTALS IN LABORATORY CLOUDS
E.R. Jayarathe and C.P.R. Saunders iPhysics
Department, UMISI, Manchester, England:
Studies haw been made of the electric
charges carried on vapour grown ice crystals
produced in the laboratory by nucleating
a cloud of supercooled water dysplets. The
charges are less than Lac (id C) which is
considerably less than charges reported elsowhore for similarly grown ice crystals. The
previous results are attributed to charge
transfers which occur during the charge detection processes. (Charging, ice crystals)
J. Geophys. Ros., Grem, Faper 310281 J. Geophys. Res., Green, Paper 300281

3740 General Circulation BYNOPTIC CLOUD VARIATIONS IN A LOW RESOLUTION SPECTRAL

STMOPTIC CLOUD VARIATIONS IN A LOW RESOLUTION SPECTRAL ATMOSPHENIC MODEL.

H.B. Gordon (Australian Emerical Meteorology Research Centra, P.O. 80x 5089AA, Melbourne, Australia. 30c1)

A spectral model of low resolution (2 vertical levels and rhombotidal versonamber truncation 15; has been used in simulations of January and July climatologies. The model has self generated cloud cover, and it is this espect which is destiled in this report. The suphasis on cloud production has been chosen partly because of a noticeable lack of detailed information on cloud production from the few other models with self generated cloud. The cloud covers produced by each simulation are intercepared by use of global mean values, romal values, through to instantaneous cloud production. It is found that the two simulations have rather different spatial and temporal characteristics. The global bean cloud cover shows much less variability between semanns than the hemisphorit means implying some stability in global cloud cover.

J. Geophys. Res., Orean, Paper 300487

3755 Internation of alsoaphere with electromag-

1755 Interaction of shoosphere with electromagnetic wave
THE SCHTILLATIONS FOR WEAK ATHOSPHERIC TORBULENCE
HANDS A PARTIALLY COREEST SOURCE
(. Mayba. Dupwrituon 18 haw-fries) hoganoering
and Cosputer Science, Morthwestern University,
Evanaton, Illinois 50201), M. A. Plosus and S. J.
Wang
The sciptillation index for wesk atmospheric
turbulence is formulated for a partially coherent
source (in space and lime). We obtain remules for
two cases when the detector has a slow and a fast
response time. Our solutions correctly reduce to
the known sointilistion index in the light of
coherent and incoherent sources. Transmitter
aperture averaging and frequency averaging effects
are shown as special cases of our results. The
limitations of the source model used and the
solution obtained for a fast detector are discussed. (Source coherence, turbulence effect
detection time, scintillation).
Rad, Sci., Paper 130483

3770 Particles and acrosols
EFFECTS OF THE EL CHICHOF VOLCANIC DUST CLOUD ON INSOLATION MEASUREMENTS AT CORVALLIS, OREGON (U.S.A.)
C.R. Nagaraja Rac and Milliam A. Bradley (Department
of Atmospheric Sciences, Oregon State University,
Corvallis, Oregon, 97331)
Insolation measurements made on clear days at
Corvallis, Oregon, along the last west of November,

or Ammospheric Scheloes, 197311)
Insolation measurements made on clear days at
Corvellia, Oregon, 97331)
Insolation measurements made on clear days at
Corvellia, Oregon, since the last west of Rowanher,
1982, have indicated a decrease of about 14% in the
atmospheric clearmess index, an increase by a factor of
about 28% In the transition and a decrease of
about 28% In the transmittence of the stronghers for
the direct normal irradiation and a decrease of
the stronghers of the stronghers for
the direct normal irradiation compared to the moral,
clear-day values. It is felt these snownizes are
caused by the increased stmospheric turbidity due to
the El Chichon volcanic dust cloud. (Insolation
measurements, volcanic dust cloud. El Chichom).
Geophys. Eas. Lett., Paper 110470

Oceanography

WALL
O. Gust (Dapt. Marine Science, Univ. of South Floride.
St. Fatersburg, Floride 33701) and J. B. Southerd
Two-dimensional equilibrium boundary-layer flows
were investigated in an open water channel with a
width/depth ratio of 6 for a smooth bad of 0.16 mm width/depth ratio of a for a smooth sea in the sea quarts grains (d₃0) and compared with those of an immbile amouth comented bed with the mass amed roughness. For flows at Reynolds numbers between 20,000, representing comes of accesion, and 28,000, before appearance of rhombold ripples, quarts grains rolled over an otherwise smooth send-bed with a density of < 40 grains cm "". Then the quiversal law of the wall, an obtained for the fixed, smooth and bed, could not be confirmed by the data. constry of an grains on "", Then the universal law of the wall, as obtained for the fixed, smooth and bed, could not be confirmed by the data. Instead, (1) a logarithmic layer was found which extended farther into the wate region and had a reduced value of you karman's constant c = 0.32 ± 0.04. (1) the firsting diagram industed Raymolds number dependent drag reduction, and (111) the logarithmic layer extended down to the top of the rolling grains at Ray > 25,000.

These results are interpreted as a new class of wall-burneds shear flow with different momentum transfer processes, and a valority-defect law throughout the flow down to the top of the rolling grains. Some conclusions are discussed for sedimentological and angiousing problems in which this type of flow is the rule rather than the exception, J. Goophys. Eas., Green, Paper 30045

J. Gaophys. Res., Green, Paper 300454

4713 Circulation
MRAR-IMPERIAL MOTIONS OFF THE ORECON COAST
I. Anderson, A. Ruyer (School of Cramography, Oregon
State University, Corvalia, Oregon, 97331).
R. L. Batth
Hear-imperial motions were observed at all current
meters in me array of five monrings appearing the
continuatal margin off central Oregon during October
1977 to January 1978. All moorings were between 10
and 130 to from shows, in water dapths between 100 m
and 2500 m. Largest meer-inertial amplitudes (200 cm/
acc) were observed at the uppertunant catract materi
of the offshore moorings although these were below
the surface mixed layer. The mear-inertial energy
generally decreased with interessing depth, and there
was less near-inertial energy over the continuatal
shelf than at similar depths offshore. The secrety

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levels observed over the shelf were about the sabe as observed there during sugmer 1973, and the energy levels observed offshore were comparable to those observed in the open North Atlantic. Horizontal coherence scales were large, exceeding 115 in during the first helf of the observational period and about the first helf of the observational period and about bo km during the second helf; estimates of the horizontal vavelength (30 km during the first helf and 20 km during the second helf) suggest that the cohorence scale is of the order of three wavelengths. Although we did not have current data in the surface sixed leaver not wind measurements over codi mosting, the switchise sectorning that symptic pressure that and hourly wind and pressure at Bourport suggest that over of the measuremental energy was forced by the local wind. (Institut currents, Oregon asset)

J. Goophys. Bos., Green, Paper 300480 4720 Distributions and vator basses
THE CONTRIBUTION OF THE GERMANS AND BAPETTS SEAS TO
THE NEED WATER OF THE APCTIC OCEAN
James N. SWIFT (Marine Life Pencarch Group. A-010,
Scrippe Institution of Obsengraphy, Le Jolia, CA
92091. The Tarkshashi and Nuysh D. Livingston
The deep waters of the Arctic Ocean are traditionally
held to be fad by an influx of Norwejian Sea Deep Water
(NSDM) via the northward-flowing West Spitzstergen Currant. Discrets semple and CTD observations obtained
from the Grasmiand-Spitzsbergen Passage in August 1981
during the Transiant Tracers in the Cosen (TTD) North
Atlantic expedition showed a -100m thick layer of
holified breonland Sea Deep Water (SDUM) tolder and
fresher than HEDM at 2500 m. spreading northward
along the bottom of a deep, unispeded channel, undermeant the NEDM. Show the wellable deta indicate that
Arctic Ocean Deep Water (NODM) has a higher salining
than SEDM, mixing of NEDM and GEM can not produce
ADDM. Therefore, other sources, such as the periphoral
Arctic Shelf seas, swat contribute danse saline water
to the Arctic Ocean. Concentrations of 1970s and 2087
observed in MODM are greater than those observed in
GEDM and NEDM. The concentrations of these radionuclides on the Barrats Sea shelf are sufficiently
high and in the ocrtred relative proportions to support
this proposition.
J. Georbye, Year, Crean, Pener William.

this proposition. J. Geophys. Res., Green, Paper 300514 4763 Barface waven, cides, and see level
TRANSFORMATION OF WAVE BRIGHT DISTRIBUTION
E. B. Thoraton (Naval Postgraduate School,
Monterey, CA) R. T. Guns (Soripps Institution
of, Oceanography, Le Jolla, CA)

The transformation of randon wave heights
during shoeling, including waven breaking in
the surf zone, is described by a one-parameter
model and compared with an extensive erroy of
measurements from 10 m depth to the shore at
Torrey Fines Beach, California. The transformetion model is beaded on an energy flux belance
with breaking wave disafpation modeled after
s bore. Breaking is hypothesized to occur,
with varying probability, over the range of
wave beights. The initially Rayleigh beight
distributions are soldied by abbailing and
breaking into may distributions which are magin
Rayleigh, but with some emergy loss. Dising incident waves measured in 10 n depth as input
conditions, the model predicts was were beights.

Home, The Esplaigh distribution describes the
measured contral measure of M₃/3 and H₂/10 with
average errors of -.12 and -1.21, respectively
J. Goophys. Res., Orees, Faper 303515

4780 Underweier sound OCEAN ACOUSTIC TOMOGRAPHY: RAYS AND MODES W. Mush 'Extipps institution of Goesnography, University of California, San Diego, California, 200931, and C. Wansch:
We have measured perturbation of the sound speed $\delta C(x,y,z)$ (~temperature) field whole as Goesn volume by repeated acoustic transmissions through the volume along many different ray paths I (The Goesn Topography Group, 1992). The dataset consisted of ray vared time parturbations 8.1, and the sound field was obtained by leverse theory (rom a bases unighted out $\delta C(x,y,z) = \Sigma_{ij}^{(1)}(x,y,z) \delta I_{ij}$ where I_{ij} is the time tipot to transmission of the sound field was obtained by leverse theory from a bases unighted on $\delta C(x,y,z) = \delta I_{ij}^{(1)}(x,y,z) \delta I_{ij}$. Where I_{ij} is the time tipot in the sound field where contained on $\delta x, x, z$. Here the method is weighted sum $B(Cx,y,x) = EA^{-1}(x,y,x) \delta t$, where A, is the time spent by ray t in a differential volume centered on x,y,x. Here the method is extended to extend to extend to t and t as several speed reinformula where tay theory is not applicable or not convenient. This is done by including in the disease the frequency perturbation δf of fromes modes. The matrix A is generalized to a combination of ray weighting and mode weighting. The procedures are illustrated for bilinear and quadratic sound channels, corresponding to a less and first arrival, respectively, of the salest ray, and for a coart profile (surprisingly close to some measured equatorial sound speed profiles) where all rays arrive together. We use a northwest Atlantic profile for illustration of an actual case, and here we find overlapping arrivel sequences which itset to additionate form letter. All this is conveniently displayed in frequency-time (ambiguity) diagrams. We discuss two lawersion schemes one based on Abol transforms, the other on humanical rather inversions. The latter whether is measured to the underlying principles, application to measurements is planned in the near future. [Acoustie, tomography, ray theory, stornal modes, Abol transforms]

Ray, Quophys, Space Phys., Paper 180449

4790 Instruments and techniques

MODILIBRATION FIRES FOR REVERSIME THERMORPHERS

A. M. De Vines; (Openography Department, Rusholdt,
State University, Areats, California, 95521) and R. T.

Modgoon

The proper relaxation time necessary before reading
Deep Sea Reversing Thermosters depands on the time
constants of the sain and auxiliary thermoseters. In
a computer admission, the maximum error in corrected
water temperatures in contered at a lag time equal to
the average of the time computer, while the heapitude
off the error is proportional to the difference in time
constants. For the thermosetime we tembed, a maximum
error of 0.03 'O was incorred by pressively reading
Deep Sea Reversing Thermosetime, (caprature)

Messattement, deep sea reversing thermoseter, reversing
thermoseter).

J. Geophys. Res., Green, Paper 100475 J. Geophys. Ros., Graen, Paper 300475